INTERNATIONAL

ASSOCIATION FOR TESTING MATERIALS.

AMERICAN SECTION.

BULLETIN NO. 25. JUNE, 1901.

REPORT OF COMMITTEE NO. 1.

PHILADELPHIA, PA., June —, 1901.

To the American Section of the International Association for Testing Materials:

The last report made by this Committee, contained in Bulletins Nos. 18 and 20, was read at the Third Annual Meeting of the American Section of the International Association for Testing Materials, October 25–27, 1900. The Chairman had the pleasure of presenting for discussion at this Third Annual Meeting, ten Proposed Standard Specifications which had been adopted by a letter ballot of the full membership of the American Branch of Committee No. 1, and which had been printed and distributed to all Members of the American Section, prior to the Third Annual Meeting. These Proposed Specifications were contained in Bulletins Nos. 8–17, inclusive.

The Secretary of the Publication Committee reported at the Third Annual Meeting that he had furnished the following Societies copies of these Bulletins, and had requested that the Proposed Specifications be made the subject of discussion at the meetings of these Societies.

American Society of Civil Engineers.
American Society of Mechanical Engineers.
American Institute of Mining Engineers.
Master Car Builders' Association.
American Railway Master Mechanics' Association.
American Association for the Advancement of Science.

In addition to the publicity thus gained for these Specifications proposed by Committee No. 1, the American Technical Press, during the spring and summer of 1900, devoted considerable space to their discussion.

The Chairman also takes pleasure in stating that one of the Members of Committee No. 1, Mr. Albert Ladd Colby, wrote an elaborate Review of the American Methods of Testing Iron and Steel, and the Specifications proposed as Standards by this Committee. This Review was presented, with the authority of the Executive Committee of the American Section, before the International Congress on Testing Materials, held in Paris, July, 1900. The author had a large edition of his paper published in English, French, and German, and the Chairman takes particular pleasure in recording the fact that this paper created more discussion than any other paper presented at the Paris Congress.

As a further evidence of the International interest taken in the work of the American Branch of Committee No. 1, it may also be stated that the Council of the Iron and Steel Institute, shortly after the Paris Congress, requested the author of this Review to prepare another synopsis of the Proposed American Standard Specifications for Iron and Steel for the Paris Meeting of the Iron and Steel Institute, held in September, 1900. At this meeting also the Proposed American Specifications brought forth an interesting discussion, and also a vote of thanks from the Institute to the author.

This brief summary indicates the International interest that has been taken in the work of the American Branch of Committee No. 1, during 1900.

On a recent visit of the Chairman to England and the Continent, he had the pleasure of meeting several members of International Committee No. 1, and in all cases found that the work of the American Branch had been highly appreciated.

By referring to Bulletin No. 21, the members not present at the Third Annual Meeting of the American Section will note that the discussion of the Proposed Standard Specifications occupied six sessions of the meeting, and that they were all referred back to the Committee, and in certain cases changes were suggested. Since the Annual Meeting, individual members of Committee No. 1 have suggested certain other revisions.

All these revisions were made the subject of careful discussion at a meeting of Committee No. 1, held in Philadelphia, May 3d, and the action taken on the revisions proposed in the Specifications were incorporated in a circular which was mailed, together with a copy of Bulletins Nos. 8–17, to each of the 33 members of Committee No. 1, with the request for a letter ballot as to whether the Specifications, as revised, were or were not representative of good American practice. The following summary of this ballot shows that the Specifications, as revised, were adopted by a large majority of the full membership of Committee No. 1, and are now offered at this Fourth Annual Meeting of the American Section for consideration and action.

			For.	Against.
Bulletin No.	8	Structural Steel for Bridges and Ships	28	1
"	9	Structural Steel for Buildings	29	0
"	10	Open-Hearth Boiler Plate and Rivet Steel	29	0
"	11	Steel Rails	29	0
"	12	Steel Splice Bars	29	0
"	13	Steel Axles	28	1
"	14	Steel Tires	29	0
"	15	Steel Forgings	29	0
"	16	Steel Castings	29	0
"	17	Wrought Iron	28	1

Declined to vote, 1. Not heard from, 3.

WM. R. WEBSTER,
EDGAR MARBURG.

Date, June 12, 1901.

It is the opinion of those Members of Committee No. 1, who have taken the most active share of the work in the preparation of these Proposed Standard Specifications, that the American Section cannot do better than endorse the work of their Committee No. 1 and adopt these Specifications as American Standards. The Committee can then be continued to take up the standardization of Specifications for other Iron and Steel materials not as yet covered, for instance, Tubes, Wire, Cast Iron Pipe, Springs, etc.

By the time that the Committee has finished their report and suggested a Standard Specification for these new materials, it will probably be necessary for them to take up some of the Speci-

fications now submitted and revise them, for it is thoroughly appreciated that in the rapid advances made in the processes of manufacture, and the increased demands made by the Engineers in their Specifications, that no Standard Specification can be in force for a long period. It will of necessity have to be modified from time to time.

Report on the Standard Turned Test Specimen of 1/2" Diameter and 2" Gauged Length.

During the discussion of the Specifications at the last Annual Meeting of this American Section, your Committee No. 1 was requested to submit a report at the next Annual Meeting, giving the reasons which had led them to recommend a test specimen of 2" gauged length, for determining the physical properties of Steel Axles, Steel Tires, Steel Forgings, and Steel Castings, and for testing large rounds of Wrought Iron, rather than a test specimen of an 8" or 10" gauged length, and to show the relation between the same materials tested in bars of the different sizes. The Chairman of the Committee appointed Mr. Albert Ladd Colby as a Committee on this subject, who has presented the following report :

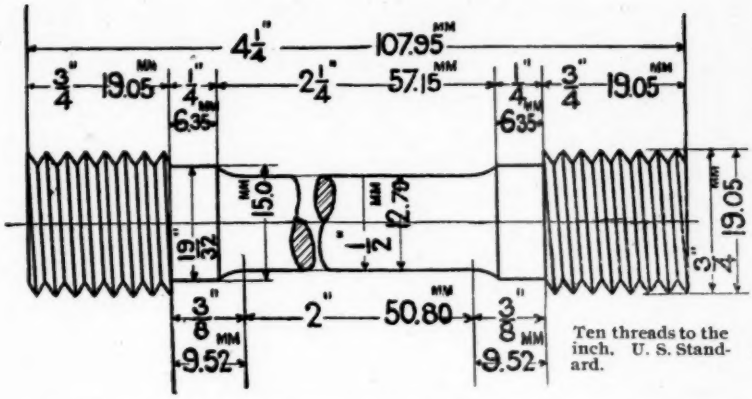
South Bethlehem, Pa., May 1, 1901.

Mr. Wm. R. Webster, Chairman American Branch of Committee No. 1.

"During the discussion of the Specifications at the Annual Meeting of the American Section, Committee No. 1 was requested to submit a report at the next Annual Meeting, giving the reasons which had led them to recommend a Test Specimen of 2" Gauged Length for determining the Physical Properties of Steel Axles, Steel Tires, Steel Forgings, and Steel Castings, and for testing large rounds of Wrought Iron, rather than one of 8" or 10" gauged length.

"You appointed me a Committee on this subject, and I take pleasure in submitting the following report :

"Much may be said in favor of the general adoption of the test specimen, shown in the following cut, of a gauged length of four diameters, for the commercial testing of these four classes of steel.



"With Axles and all Steel Forgings a much shorter prolongation of the Forging is required for a longitudinal specimen of the above length than for a test specimen of eight-inch (8") gauged length. The shorter specimen, therefore, requires the manufacturer to consign much less good metal to scrap, an item of considerable importance to the customer in the case of Forgings of large diameters.

" Furthermore less time and labor is expended in cutting out and machining the shorter test specimen. At a given cost a much better idea of the quality of the metal can therefore be obtained, for several short specimens can be taken at different positions in an important Casting or Forging at the same cost for preparation as one long specimen.

" The shorter specimen has also the great advantage of enabling the customer to determine the character of the material at places in a complicated Casting or Forging where there is not space enough for a longer specimen, as between the webs of crank shafts. In the case of Steel Tires the shorter specimen is greatly preferable, for when cut from the rim of the tire used for the drop test, the longer specimen can very seldom be obtained unless the Tire is heated and straightened, an operation which at once destroys its value as a representative test of the finished Tires of the melt.

" Finally the physical properties called for in the Specifications for Steel Castings, Steel Axles, Steel Forgings, and Steel Tires can be accurately and readily determined when using the stand-

ard test specimen recommended. For in cases where Elastic Limit is specified instead of Yield Point, an apparatus reading to the one-ten-thousandth of an inch (0.0001″) can be easily attached and readings readily made. The determination of the Tensile Strength is not materially affected by the length of the specimen. The percentage of Contraction of Area and the quality of the fracture, both very important factors in determining the quality of the metal, are shown with equal accuracy and distinctness with the shorter specimen, as with one of greater length. The higher percentages of Elongation obtained on two inches (2″) are compensated for by having correspondingly higher requirements in the Specifications.

"In proof of the above assertions, the writer submits the following table, showing a series of comparative tests made with much care on the 300,000 pound Emery Hydraulic Testing Machine used by the Bethlehem Steel Company. In each case the tests were threaded on both ends and the Elastic Limit made with an electric micrometer.

"COMPARISON OF THE PHYSICAL PROPERTIES OF STEEL FORGINGS DETERMINED ON TEST BARS OF TWO-INCH (2″) AND OF TEN-INCH (10″) GAUGED LENGTH.

Character of Forgings	Tensile Strength, lbs. per sq. inch.		Elastic Limit. lbs. per sq. in.		Extension in 2″ and 10″.		Cont. of Area.	
	2″ Bar	10″ Bar	2″ Bar	10″ Bar	2″ Bar	10″ Bar	2″ Bar	10″ Bar
					Per cent.	Per cent.	Per cent.	Per cent.
Engine Forgings .	86,580	88,800	49,910	50,220	28.00	17.00	58.00	51.04
Crank Web.....	81,490	79,820	49,910	46,210	30.00	22.70	58.00	51.70
Link Beam Pin...	93,200	90,390	60,090	59,320	27.00	19.60	59.96	56.83
Crank Pin.....	90,650	88,980	60,090	62,120	28.00	20.00	62.53	60.91
Engine Forgings .	91,670	89,740	59,080	62,370	28.50	18.00	60.55	55.63
Crank Web.....	84,030	82,860	53,980	51,940	27.00	24.30	51.55	56.44
Crank Web.....	89,120	86,440	53,980	53,200	27.00	21.30	54.83	53.06
Pin	94,600	94,330	60,330	62,880	26.00	19.80	52.73	51.28
Crosshead Pins and Collars.....	89,630	87,820	55,000	52,440	27.00	19.80	49.29	46.56
Main Shaft and Eccentric Rod..	89,990	91,530	52,150	56,520	25.50	20.00	46.48	49.30
Engine Forgings .	91,670	89,880	63,150	62,500	26.00	21.00	49.57	50.72
Engine Forgings .	92,180	91,020	62,130	61,980	26.50	19.80	47.57	44.65
Piston Rod.....	90,140	85,290	51,950	52,950	27.00	19.00	58.00	55.77

(Signed) ALBERT LADD COLBY."

It was the sense of the Meeting of Committee No. 1, held on May 3, 1901, that this Report proves conclusively that no just criticism could be made of the Committee's action in adopting the Test Specimen of 2″ Gauged Length, provided correspondingly higher requirements in percentages of elongation were specified, and the requirements mentioned in the various Specifications showed that this had been the case. A motion was carried accepting Mr. Colby's Report, and the committee was discharged with the thanks of Committee No. 1.

Your Chairman has recently carried on an active correspondence with Herr Rieppel, Chairman of International Committee No. 1, and also had the pleasure recently of a personal interview with M. Alpherts, Vice-chairman of the International Committee No. 1, and has to report that they thoroughly approve of the manner in which the work of the American Branch of Committee No. 1 has been carried out, and that in place of sending Herr Rieppel a large number of individual Specifications on the blanks originally furnished by him, that all he now wants is the Proposed American Standard Specifications filled out on his tables.

The Specifications now offered for discussion and action at this Annual Meeting have already been arranged on the blank tables furnished by Herr Rieppel and have been forwarded to him, with the understanding that if any changes were made at this Annual Meeting, that he would be promptly notified. From this you can see the importance of our taking definite action at this meeting in order that our work may be properly considered at the Buda-Pesth Congress of the International Association for Testing Materials, in September, next.

(Signed) WM. R. WEBSTER,
Chairman American Branch of Committee No. 1.